MEDICINE IN THE UNITED STATES, AND ITS RELATIONS TO COÖPERATIVE INVESTIGATION.

Mr. President, and Gentlemen of the British Medical Association: You all know that the representative of the American medical profession first selected by your executive committee to deliver the Address in Medicine to-day, was the late Dr. Austin Flint, Sr., of New York, whose death last March is, therefore, a great and direct loss to you as well as to America. Every English physician knows Dr. Flint by reputation and through his writings; but only those few of you who were so fortunate as to know him personally, can fully appreciate the magnitude of the loss which the medical profession has sustained in his death.

This is not the time and place to attempt to pronounce a fitting eulogium upon him and his work, and I shall, therefore, only say that my deep personal sorrow for his removal is mingled with sympathy for the members of this Association, who have been thus deprived of the pleasure of hearing him state in person some of the results of his long and wide experience. The loss is not a total one, it is true, since he had, fortunately, completed his address on "The Medicine of the Future," which has been published, and has, no doubt, been read by all of you; but in this case the printed page is by no means a satisfactory substitute for the spoken word.

In accepting the request, with which I have been honored by your Council, that I should attempt to take his vacant place on this occasion, it is with a full understanding of my inability to fill it that I stand before you.

The request came at a time when I was hard pressed by official duties, and had neither leisure nor opportunity to undertake any special research; hence, to avoid violating one of my favorite Scotch maxims, viz., "That which you do not know, tell that not to any one," it was necessary to select some subject to which I had already given consideration, and which at the same time would probably be of interest to English physicians. Reflection on these restrictions soon brought the field

of selection into narrow limits, almost into "a small intercept of space of one dimension," as a mathematician would say.

What is the significance of this invitation extended for the first time to a physician of another country, and that country the United States, to come to this annual gathering of the medical men of Great Britain and give the address in medicine?

Does it not mean recognition of the unity of medicine, of the utility of coöperation, of the fact that we have common interests, and that the time has come when it is desirable to hear from the outlying younger branch of the family with a view to mutual pleasure and profit in the future? So it seems to me; and I propose, therefore, to call your attention briefly to some points relating to the present condition and future prospects of medicine in the United States, and to the direction in which you may reasonably hope and expect from that country in the future the most useful coöperation in the improvement of medical science and art. I believe that these must be matters of interest to you, and that I can perhaps make clear certain peculiarities which do not seem to be as generally understood on this side of the Atlantic, as it is desirable that they should be, to insure sound judgment upon some of the results observed.

In the first place, permit me to call your attention to the fact that it is hardly possible to make any statements with regard to medicine in, or the medical profession of, the United States as a whole, which shall be definite and at the same time distinctive; that is, which will not apply almost equally well to medicine and the medical profession in other countries. This is due to the fact that there are great differences in the organization of the profession in different parts of America, so that what is true of one State would not be true of another; what is required as to fitness or qualification to practise in one place is not required in another; and the country covers so many parallels of latitude and meridians of longitude, making the conditions of life so diverse, and producing such differences in the prevailing diseases, that a man who is fairly qualified to practise in one section may be poorly fitted to treat the endemic diseases of another.

As in painting a picture, it is best to locate and define the shadows first, and deal with the lights afterward, let us begin by considering some of the things that American physicians complain about; in other words, some

of their supposed grievances. One of these is that the profession is overcrowded; that there are too many doctors, both *in esse* and *in posse*, and that this is due to too low a standard of education, and to the want of legal restrictions as to the qualifications which shall give a man the right to practise. The feelings of some of our physicians on this subject are in full accord with those of the good old New England deacon who told the village scapegrace seeking admission, that "he thought the church was about full."

Now what is the number and distribution of medical men in America? Statistics gathered in 1883[1] showed that in the United States and Canada there were 90,410 persons calling themselves physicians, being in the proportion of 1 to every 600 of population. In Canada alone, there were 3487 physicians, or 1 to 1112 of population. If we take the figures of our last census, of 1880, the proportion of physicians reported, is 1 to 589 of population, or 17 per 10,000. In England and Wales, by the census of 1881, the proportion of physicians is only 5.8 per 10,000, but these figures are not properly comparable with those of the United States, because they do not include unregistered persons. If the same classes were included that are counted in the United States report, I presume that the proportion would be about 9 per 10,000, or a little more than half that in the United States.

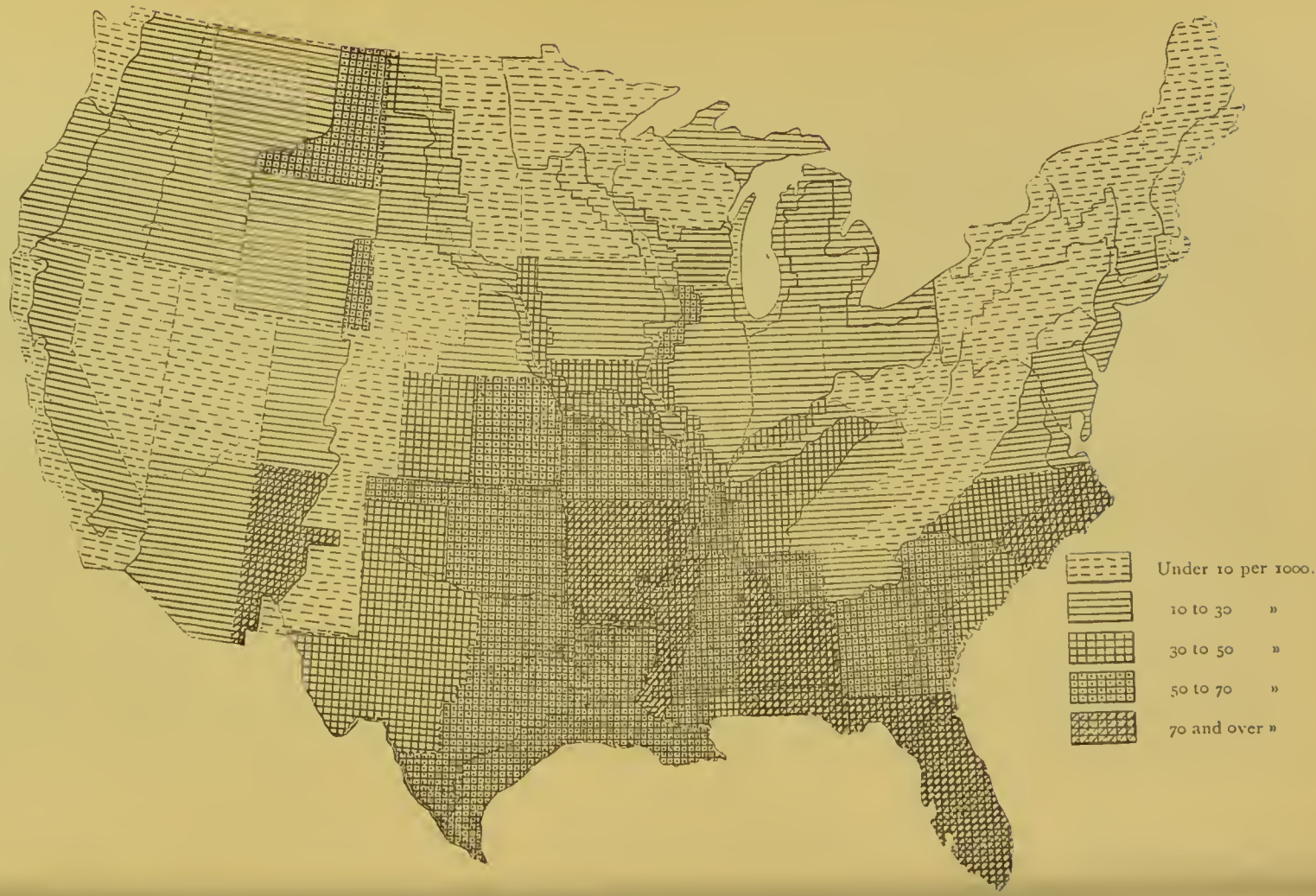
In the United States the proportion to the population of those who call themselves physicians varies greatly in different localities; thus, in Colorado there are 29.3, in Indiana 25.2, in Oregon 24.3, and in Arkansas 23.5 per 10,000; while in New Mexico there are only 6.6, in South Carolina 9.2, and in North Carolina 9.7 per 10,000.[2]

It is not easy to give satisfactory reasons for these differences; we can only say that they do not depend to any great extent upon local legislation. The proportion of physicians is generally lowest in the southern States lying east of the Mississippi, and highest in those regions where immigration has recently been active. If we compare, by localities, the proportion of physicians to the population with that of clergymen and lawyers,

[1] Illinois State Board of Health Report, 1884.

[2] A map of the United States was here shown, on which the proportion of persons calling themselves physicians to the population in the several States was indicated by different shades of color.

CHART I.



we find some curious differences. It seems that the lawyers in the United States number 12.7, while in England and Wales they are 6.6 per 10,000, but that on the other hand the clergymen are 14.6 in England and 12.8 in the United States per 10,000 of population. In many instances it seems that where the lawyers are most numerous the supply of clergymen is smallest. I believe that a fair proportion of physicians to population is about 1 per 1000, which is not far from the actual proportion in England, while the true proportion of practising physicians in the United States is about 1 in 750. We must admit then, that there is at all events no scarcity of physicians in the United States, and, as we have over eighty medical schools at work, besides a fair proportion of medical immigrants, there is no immediate danger of any interruption to the supply.

Let us now consider the second head of the complaint, viz., that the standard of education is too low. There is ground for this, considered with reference to some localities, but not for others. I said a moment ago that a man might be fairly qualified for practice in one part of the country and yet find himself at a loss in another. This needs a little explanation, which I can, perhaps, give most easily in connection with a map of the United States, which I here show you. This map, which was prepared for a very different purpose, indicates by different shades of color, the relative proportion of deaths reported as due to malarial disease to the total number of deaths in different parts of the country, for the census year 1879–80. You will note how comparatively light the tint is in the north and northeast, and how dark the shades become in the south and in the valley of the Mississippi, thus indicating the great differences which exist as to the prevalence and deadly effects of the malarial poison in different sections of the country. It is in some of these low bottom lands and swampy districts that we meet with cases of congestive chills and of malarial hæmaturia, cases in which the patient has been described as being "a mere appendage to a huge malarial entity, an incident of a miasmatic cataclysm." Furthermore, this strip of land bordering on the Gulf-coast is in the yellow fever zone, and has, heretofore, been repeatedly desolated by this pestilence.

As compared with the North and East, much of this malarious region is a thinly settled country, an almost purely agricultural country, and not a rich country. I need hardly tell you that the physician who has re-

ceived his chief clinical instruction in the office of his preceptor in Vermont or New Hampshire, supplemented by distant glimpses of a few cases in hospital in Boston or New York, will find himself at a loss at first in dealing with the emergencies of daily practice in Arkansas and Mississippi. He will be subjected to influences which at times are dangerous to one who is not acclimated, and which tend to produce depression of spirits, want of energy, and bad health. He will not have free and constant access to scientific companionship, nor be stimulated by the influence of learned societies, and he cannot avail himself of the ordinary sources of amusement, education, and rest, such as art galleries, the drama, libraries, and museums, etc., which are found in the large cities. Moreover, the pecuniary reward which the practitioner in many of these places can reasonably hope for is comparatively small.

Taking all these things into consideration, it is clear that if a man after spending from six to eight years, and from one to two thousand pounds in acquiring such a general and professional education as it is now considered that a skilled physician should possess, then settles in such a region with the prospect of an average income of from £150 to £200 per year, it is not from pecuniary motives alone. There are such men in such places, men who are not only highly educated and skilled practitioners, but who are also original investigators and thinkers. It was within the limits of this malarial shadow that the foundation of modern gynecology was laid by Marion Sims, of abdominal surgery by McDowell, Battey, and Gross, of an important part of the physiology of the nervous system by Campbell. Nevertheless the rule holds good that malaria and science are antagonistic; the exceptions prove the rule.

Nor can the inducements for highly educated physicians to settle in thinly settled localities be made stronger by any form of penal or restrictive legislation. Any attempt to fix a standard of requirements or qualifications for practice which shall be the same for such rural districts and for the large cities and manufacturing towns, must result in the adoption of what competent judges would consider so low a standard as to be ridiculous and useless. The demands are widely different, and corresponding differences exist in the sources of supply—that is, in the medical schools.

There is a class of medical schools in the United States whose object is to give the minimum amount of

instruction which will enable a man to commence the practice of medicine without much danger of making such serious and glaring blunders as will be readily detected by the public. There are other schools whose aim and object is to make fairly well trained practitioners; the general character of the instruction given in these being substantially the same as that given in your English hospital medical schools. The results of such a three years' graded course of instruction in medicine as these schools furnish, depend upon the character of the material upon which they work; that is to say, upon the general preliminary education possessed by the student at the time of his matriculation. This is evidently too often defective, and only a few schools have thus far ventured to establish any standard of preliminary examination which at all approaches in its demands that which is required in England.

The proverb that it does not pay to give a $5000 education to a $5 boy is clearly of American origin, and sums up a great deal of experience.

You have nineteen portals of entrance to the profession and have not found it easy to keep them all up to the standard. In America we have over eighty gates, a number of turnstiles, and a good deal of the ground is unenclosed common. Many of our physicians are more or less dissatisfied with this state of things and with the results thereof, and every year in some States efforts are made to secure legislation which it is supposed will protect the interests of the profession, though those who advocate such legislation are usually prudent enough to claim as their only motive a desire for the protection of the public.

Now, how does this free trade in medicine and the low standard of qualification or no standard at all required by law affect practitioners as individuals? To answer this we must divide the profession into several classes. In the first place, in all our cities, great and small, there is a large class of physicians who are as well educated and as thoroughly competent to practise their art, as can be found in the world. They have studied both at home and abroad, have had extensive clinical training, are always supplied with the latest and best medical literature and the most improved instruments, and many of them are connected with hospitals and medical schools. Among them are found the majority of our writers and teachers, and the successful men are the survivors of a struggle in which there has

been keen and incessant competition. These physicians, whose positions are fairly assured, and who, as a rule, have all the practice they desire, are not usually active leaders in movements to secure medical legislation, although they passively assent to such efforts, or at least do not oppose them; and their names may sometimes be found appended to memorials urging such legislation. They are clear-headed, shrewd, "practical" men, who know that their business interests are not specially injured by quacks and ignoramuses—rather the contrary in fact, for they are called on to repair the damage done by the quack to people who have more money than brains; and they are not inclined to risk the fate of the Mexican donkey who died of "*congojas agenas*" —that is, "of other people's troubles."

Then there is another large class of honest, hard-working practitioners who rely more on what they call experience and common sense than on book learning. Many of these have obtained assured positions of respectability and usefulness, and are comparatively indifferent to medical legislation so far as their own interests are concerned. Others, however, who are not so successful, feel the competition of the local herb doctor or of the travelling quack more keenly, and have more decided views about the importance of diplomas. Among these are the young men who have not yet acquired local fame, and who are apt to become very indignant over the doings of some charlatan in the neighborhood, or of some druggist who prescribes over his counter. These last are usually quite clear in their minds that the State ought to interfere and prevent injury to the health of the people.

I have known two unsuccessful physicians who finally abandoned practice and who gave as a reason for their failure—one that "he did not know enough," and the other that "he had not the manners and tact which would inspire confidence in his patients;" but such frank-speaking men are rare.

Thus far, as a rule, the efforts which have been made to secure legislation upon medical matters in America have come from the profession itself and have been chiefly urged and recommended by physicians. The general public, and even the educated public, has shown very little interest in the matter. It does not demand protection against ignorance, but entrusts the care of its health and the lives of those who are nearest and dearest to it to almost any one who announces him-

self as prepared to take charge of them. The number of those who profess to practise medicine in the United States and are not qualified to do so is undoubtedly large, though by no means so large as one might suppose after listening to the impassioned eloquence which is duly aired every year upon the subject. There are some advertising charlatans, and travelling quacks are occasionally to be met with, but they are rare.

The most rigid tests of qualification, in our profession, in the United States are those required of candidates for admission into the medical departments of the army and navy. The standard established for these is about the same as that for the corresponding corps of the English army and navy; and of the candidates who apply, from seventy to eighty per cent. are rejected.

Certainly we must admit that this percentage indicates an unsatisfactory state of things. But what evidence have we as to its results upon the health and life of the people? What shall we take as the measure of the difference of skill in physicians? The death-rate? If we compare the death-rate of the United States with those of other civilized countries, we find that it is as low as any with the exception of Sweden. Does a low death-rate mean better sanitary condition or more skill among the doctors? For the last twenty years the death-rate has been diminishing in England; the average amount of life for each person here has been increased, but I observe that the sanitarians claim this as proof of the value and importance of their efforts, and that nothing is said about its being in any way due to increase in medical skill or to improvements in medical science. Evidently this test is not a convincing one. Almost the only matter in which figures seem to demonstrate the importance of superior medical education and skill is in the statistics of deaths due to childbirth and of the results of surgical operations.

The proportion of deaths from childbirth to the number of births is decidedly greater in the rural districts than in large cities, and among the colored than among the white population. If this difference were found only in the United States statistics, it might be accounted for by the differences in the trustworthiness of the sources from which the data are derived; but we find similar differences in England, and we must admit that these are probably largely due to the fact that in cities labor cases receive more prompt and efficient professional care than they do in the country. I need hardly call your atten-

tion to the results of antiseptic surgery, or of modern abdominal surgery, as compared with those of twenty-five years ago. Here there can be no question as to the improvement. It is well to remember in this connection that whatever undue prolongation of disease or unnecessary mortality is due to want of skilled medical treatment occurs mainly among the wage earners, the farmers, mechanics, salesmen, needlewomen, etc., and not among the rich, nor yet among the very poor.

Now, seeing that really efficacious legislation with regard to medical education or to the practice of medicine must, like all efficacious legislation, be substantially in accord with public opinion, since it is impossible to continue to punish for any length of time that which public opinion does not condemn; and as the great mass of the people of the United States have not as yet had such evidence as they can understand, and which would thoroughly convince them that it is to their interest to suppress quackery, it follows that it is necessary to go slowly and to allow such evidence to accumulate.

To me it seems that the most important of the first steps to be taken in this direction is one which has already been taken in Great Britain—namely, the requirement that every death in the community shall be registered, and that in such registration satisfactory evidence shall be given as to the cause of death, sufficient at least to prove that such cause is what is known as a natural cause—that is, that it is not due to crime. When it is admitted that one of the duties of government is to provide for such registration, both in the interests of life and to secure the rights of property, it follows, necessarily, that those persons whose certificates as to the cause of death are to be accepted as satisfactory evidence that there has been no foul play, must present evidence that they are properly qualified to make such certificates. The principle is precisely the same as that which induces a government to provide for the examination of the medical men whom it employs in its army and navy.

So far as the art of medicine is concerned, the demand has much, though by no means all, to do with regulating the quantity and quality of the supply; and there are few localities in the United States where the qualifications of the medical man is not fully up to the standard which the community is able to appreciate and is willing to pay for. In the natural order of things, suffering and death are the remedies for ignorance, weakness,

and vice, and the means of preventing the transmission of these characteristics to offspring. These remedies, though effectual, are drastic, and we do our best to avoid them, but perhaps it is well that the penalties cannot be done away with altogether.

The laws regulating the practice of medicine in the United States are all State laws. If we were to judge only from what may be found in the statute books, assuming that all the laws contained therein are duly enforced, we should find that nearly two-thirds of the States have laws ostensibly regulating the practice of medicine within their borders. As a matter of fact, however, in over half the States which have laws on this subject no attempt is made to enforce them, and in almost all of them the possession of a diploma, no matter from what source derived, is all that is required.

Of the various methods which have been tried in different States to insure by law that physicians shall be properly qualified, I will call your attention to two which are of special interest.

The first is that of Alabama, the principle of which is to organize the whole medical profession of the State, and use it as the means of regulating the qualifications of practitioners and of caring for the public health. The Medical Society of the State of Alabama with its branches, the county medical societies, thus forms a part of the machinery of the Government; it appoints boards of medical examiners, selects State and county sanitary officials, supervises the registration of vital statistics, the administration of quarantine, etc., — in short, it is the State Board of Health, and the county branches are the county boards of health.

In this State the possession of a diploma does not give the right to practise, it simply enables the owner to go before the examining board. The examinations before the County Board are partly in writing, and are subject to review by the State Board, which has in some instances publicly condemned the local examinations as not sufficient.

This system has now been in operation nine years, and has gradually been consolidated and improved by educating local boards, and getting all physicians interested in it, until it is now working fairly well. Much remains to be done, and it is too soon to predict results; at present, the success of the system is largely due to the wisdom and energy of one man, who has given his whole time and labor to the work, and it remains to be

seen whether the machine which he has built will work well without him.

The second system to which I will call your attention, is that of the State of Illinois, which was commenced in 1877, or about the same time as that of Alabama.

In Illinois any one who presents a diploma, or license to practise, from a legally chartered medical institution in good standing, is entitled to practise, and the State Board of Health is to decide as to what shall constitute "good standing." The Board of Health also examines all persons who do not possess satisfactory diplomas, and who nevertheless wish to practise in this State.

One of the greatest practical difficulties in the way of providing any system of State examinations in medicine in the United States, is that public opinion will not support any law which can be supposed to condemn or in any way to injure homœopathic and eclectic practitioners or their schools, and hence any proposed law relating to medicine, or to the organization of State boards of health, which does not recognize the existence of these sects will, in many States, at all events, meet with enough opposition to defeat it. In Illinois this difficulty was surmounted by the arrangement, that of the five physicians on the Board, one should be homœopathic and one eclectic. The Kansas law, passed last year, goes further in this direction, and provides that appointments must be so made that no school of medicine shall ever furnish a majority of the members of the Board. Much to the surprise of many, the Illinois plan has worked very well—there has been no quarrelling in the Board—and the homœopathic and eclectic members seem to have upheld quite as high a standard of qualification as their fellow members. The results of the work in Illinois have been very good. A large number of ignorant charlatans were forced to leave the State. The requirements of the Board as to what shall constitute a medical college in good standing have been raised, and it has thus caused improvement in the medical schools, not only of Illinois, but of other States. Moreover, the neighboring States have been stimulated to action, not only by the force of example, but because they received the men who had been driven out of Illinois, and found the accession an unpleasant one.

As in the case of Alabama, it is too soon to judge definitely of the results; and in Illinois, also, the satisfactory working of the system is largely due to one man, the Secretary and executive officer of the Board,

who has given his entire time to the work. I do not, by any means, wish you to suppose, however, that I consider this as being a serious objection to this or any other plan, for in the building up of any organization, or the carrying out of any system, much must always depend upon some one man.

The relations of the United States Government to medical education and to the practice of medicine are indirect only, the regulation of these matters by law being part of the police power which, under the constitution, is reserved exclusively to the individual States. The United States employs physicians in its Indian Department, in the Pension Department, in the Marine Hospital Service, and in the medical departments of the army and navy, and it has power to regulate the practice of medicine in those territories which are not yet organized into States, and also in the District of Columbia; but thus far it has made no use of such power. The qualifications of physicians employed in the army and navy and in the Marine Hospital Service, are determined by examinations made by boards of medical officers belonging to those services. The possession of a diploma from a respectable medical college is a prerequisite for such examination, but beyond this it does not count; that is to say, the examination is the same for the holders of all diplomas, and covers all branches of medicine. But while the relations of the general government to medical education are thus indirect, they have of late years become of very considerable practical importance, and are now exerting much influence upon medical investigations and literature. This is being effected by the museums and libraries which are now being formed under the auspices of the government at Washington, and also, to some extent, by certain special investigations undertaken by the government in the interests of preventive medicine. Of these various agencies one of the most important is the library which has been formed at Washington, under the auspices of the medical department of the army in connection with the Army Medical Museum; both of these institutions being a part of the results of the late civil war. The museum was at first formed to illustrate military medicine and surgery, giving the results, primary and secondary, of injuries inflicted by modern weapons of warfare and of the diseases of armies in the field; in which direction the collection is unrivalled in extent and completeness. Gradually its scope has been enlarged

to include illustrations of anatomy, development, and all branches of pathology and therapeutics, so that it is fast becoming a museum covering the whole field of medical science. In like manner, the library, which commenced in a collection of those books relating solely or especially to military medicine and surgery, which were required in the compilation of the *Medical and Surgical History of the War*, has expanded into a great medical library, which is now one of the best practical working collections of the kind in the world. These collections, then, no longer appertain exclusively, or chiefly, to the business of one department, but belong to the whole profession of the United States as a body; and the department which has charge of them is managing them from this point of view. The influence of the library in stimulating research, and upon the quality of medical literature, is already very perceptible, and is destined to increase with advancing years. I think I may also venture to claim that the utility of these collections, and especially of the library, is by no means confined to the medical profession of the United States, for the catalogues and indexes which are being issued in connection with them, are of service to medical writers and teachers all over the world.

As regards investigations into the causes of disease, undertaken at the expense of the general government, only a beginning has as yet been made; but it is sufficient to indicate future possibilities and probabilities. The main importance of the work of the National Board of Health, which was organized in 1879 under the stimulus of the great yellow fever epidemic of the previous year, was due to investigations upon the causes of yellow fever and diphtheria, the relations of soils and of water-supply to certain diseases, etc., investigations of the same general character as those which are being prosecuted under the auspices of the Local Government Board in this country, and of the Imperial Board of Health of Germany. It is true that owing to circumstances which I cannot here explain, the work of the National Board of Health has been stopped; but there is every probability that it will be resumed, with perhaps some change of organization, at no distant day, and I need not dwell upon the vast importance to medical science of organized and systematic work in this direction. Similar investigations have been undertaken by State boards of health, and especially by the State Board of Health of Massachusetts, and the

fact that governmental health departments are tending to work in this direction is significant as to future coöperation from such sources.

In this connection should be mentioned the National Museum of Hygiene, which has been formed under the direction of the medical department of the United States Navy, which is now one of the most instructive collections of the kind in the world, and has also connected with it an excellent library and a well-equipped laboratory.

Comparative and experimental pathology is also receiving attention from the Government under the direction of the Department of Agriculture, which is doing some good work in the investigation of the diseases of our domestic animals. Our investigators are, fortunately, not hampered by antivivisection laws, and there is little danger that they ever will be, for though we have our due proportion of fanatics and seekers of notoriety who wish to emulate the British Antis-, their true motives are so well understood that they have little power to do mischief.

Of medical associations in the United States there are several classes. We have a few local societies, analogous to clubs in their organization, which own property in the form of buildings, libraries, etc., are somewhat conservative in their selection of members, and are only to be found in large cities. Of these, the College of Physicians of Philadelphia is the oldest, and has the largest and best library and museum—it will celebrate the hundredth anniversary of its existence next year. In New York the Academy of Medicine, and in Boston the Medical Library Association, are of the same character, and, in general, each large city has a similar society, although as yet they have not become fully anchored and established by the acquisition of property. The second class includes local societies devoted to specialties, such as pathology, obstetrics, etc. These also are found only in large cities, and as yet are few in number. Four of them only have published transactions. Corresponding with these are national societies devoted to specialties such as gynecology, ophthalmology, surgery, pathology and clinical medicine, etc. These societies meet annually, elect their own members, exercising care in the selection, and publish valuable transactions.

Another class is composed of the county medical societies, which strive to include all regular practitioners residing in their precincts. From these are sent dele-

gates who form the State medical societies and the American Medical Association. The mode of organization varies somewhat in the different States, but the representative principle prevails in all. Most of these societies publish transactions, and the American Medical Association now has its journal.

As to the condition of medical science and art in America, it partakes of the general progress, for the press now makes all discoveries the common property of the civilized world. The marked feature of the present epoch is the recent advance in knowledge as to the relations between microörganisms and certain diseases, and the strong stimulus which this has given to preventive medicine. Sanitation is becoming fashionable, and if we may believe some of its votaries, it is a very simple matter to prolong the average lifetime to the scriptural "three score years and ten." All that is necessary is that everything shall be clean, and every person virtuous.

Having learned to distinguish those diseases which can be prevented much more easily and certainly than they can be cured, we may turn them over to the sanitarian, who has his own battles to fight with ignorance and prejudice. If he succeeds, and so far as he succeeds, he will change, in certain respects, the work of the practitioner.

The lives which are saved from cholera and typhoid, from consumption and diphtheria, and from the acute specific diseases, will, at last, be weakened and destroyed in other ways. The work of the physician will not be lessened by preventive medicine, it will simply be required more for older persons, and for another class of diseases. As sanitarians must depend upon practitioners for much of the information which is essential for their work, it follows that if preventive medicine is to become a working power, it will bring the mass of the profession into closer relations with the State than its members have held heretofore. What these relations shall be is one of the most interesting, and, at the same time, one of the most difficult, of the many problems with which we, or our successors, must deal. I have referred to some experiments on this subject which are now being tried in America, where it is much easier to make such trials than it is an older country hampered with vested interests.

Just at present, in this, as in a number of other things, our tendency is toward centralization, both in the several

States and for the whole country, and it is not improbable that we may go far on this road in the future.

I come now to the consideration of the second part of my subject, namely, the direction or manner in which we have reason to hope that medicine will be developed in the United States, and the kind of coöperation which you may reasonably expect to receive from the medical profession of that country.

A marked feature of the present day, in medicine as in other things, is the tendency to specialization in study and in practice. But this very development of specialties, of increasing minuteness in the division of labor, increases the necessity for coöperation, and in fact tends to create what we may call the specialty of coöperation. Formerly a rifle, or a watch, was made by a single workman. No two instruments were exactly alike, each piece had its own individuality and was not interchangeable, and the cost of the whole was such as to put it beyond the reach of the multitude. Now, the work on these things is greatly subdivided, one man makes only one small wheel, or spring, or pinion, and another another, each doing his work according to a uniform pattern, rapidly, perfectly, and at comparatively small cost.

But, in addition to the workmen who make the individual parts, it is now necessary to have one person specially skilled in making drawings and preparing patterns, another to assemble the completed parts, and a third, to test the whole after it has been put together. As the centrifugal force increases, the centripetal power must also increase.

In one sense medicine, as we have it to-day, is the result of coöperation, not of deliberate, centrally planned and direct coöperation, but of natural selection from results produced by many men, often working at cross purposes and, therefore, wasting much energy, but nevertheless working, though blindly, to a common end. And it is safe to predict that in the future much of the best work will be done in the same way, by individual effort inspired by the love of science, by personal ambition, etc. But the results obtained in this way come slowly, and some things that we want can hardly be obtained by individual effort, even if we were willing to wait, hence we must look to organization for help.

This is an age of machinery, of exchanges, of corporations, for all these correspond to one and the same fundamental idea. Men make machines to do what the

individual cannot do, and they make them not only of brass and iron, but of men, for such an obvious source of power to the man or men who can master the combination is not likely to be overlooked. One result of such organization is seen in our encyclopedic works on medicine, whether these be called dictionaries or handbooks; another in the great medical journals; another in associations which seek to wield political influence; another in the comparatively recent attempt at collective investigation of disease. With these may be classed also the attempts of Government departments to make scientific investigations, to collect libraries and museums, to do things which require long continuity of effort on a definite plan in order to produce the best results.

And it is by the combination of all these, with the efforts of individual workers, that substantial advance and improvement are to be effected.

In this broader view of coöperation it is interesting to consider those fields of labor to which comparatively few physicians can devote themselves, because of want of time and opportunity, but whose proper working is, nevertheless, of the greatest importance to the practitioner.

One of these is experimental laboratory work, and in this direction the prospect of valuable contributions from America is now exceedingly good. Some of the wisest of our most wealthy men have shown their appreciation of the responsibilities which riches entail on their possessors by seeking new channels through which to benefit their fellow men. While the old and well-known methods of endowing hospitals and charitable institutions are not neglected, there is apparent an increasing tendency to endeavor to promote the advancement of knowledge, and especially of such knowledge as tends to the mitigation of suffering and the improvement of the race, to furnish means for the investigation of disease, to provide laboratories, and to endow medical schools and thus place them beyond the reach of the temptations and difficulties which must always exist when such schools are dependent upon the fees of students, and are, therefore, practically commercial manufacturing establishments.

As illustrations of this tendency, I may mention the bequest of £1,400,000 by Johns Hopkins to endow, in the city of Baltimore, a university and a hospital of which the medical department is to be a special feature, to be

provided with the best laboratory and other facilities for original investigation as well as for teaching; the gift of Mr. Carnegie to the Bellevue Hospital Medical School of New York in the shape of a well-equipped pathological laboratory; the presentation by Mr. Vanderbilt, and members of his family, to the College of Physicians of New York, of £200,000, to provide for that school new buildings and clinics having the best means of teaching and research, and the endowment by an unknown donor, of a laboratory for the University Medical College of New York, with the sum of £20,000.

Last year, in his retiring address as President of the New York Academy of Medicine, Dr. Fordyce Barker referred to this tendency to regard wealth as a trust to be used for the benefit of humanity, and after sketching the requirements of the Academy on a scale which would require an endowment of at least a million of dollars, predicted that such an endowment would be furnished by wealthy citizens of the city. I believe that he was right, and that his prediction will become history.

As the class of men who have wealth, leisure, and knowledge becomes greater, there comes an ever increasing demand, not only for the best medical skill, for the most expert practitioner, but also for exhaustive research in every direction which promises to furnish new means for the prevention or relief of suffering, and for warding off, as long as possible, the inevitable end; and hence there is little reason to doubt that the examples I have named will be followed by others in the near future. With such opportunities, and under such conditions and influences, the stimulus to the young and ambitious worker is strong; we have abundance of material of this kind upon which the process of natural selection can operate, and there is little reason to doubt that the result will be substantial and valuable contributions to physiology, pathology, and therapeutics.

I have already referred to some of the work which has been undertaken by the United States Government for the benefit of medicine and of the medical profession in the formation of a library, and the providing of means of assistance in bibliographical research. There is another most important means of advancing medical and sanitary science which only a Government can furnish, and in which field of work England now stands preëminent—I refer to vital statistics. In this field, the United States Government has thus far done but little, yet enough to show the great interest and value of what

we have a right to hope will be done in the future by combining the work of the several States. This is one of the fields in which international coöperation is most desirable; it alone can furnish data sufficiently complete and reliable for a scientific consideration of the relations of disease to geographical and race distinctions.

Geographical pathology is a very old branch of medicine, as old, at least, as Hippocrates, whose treatise on airs, waters, and places is justly famous. Permit me to remind you of its opening clauses. "Whoever wishes to investigate medicine properly should proceed to consider the seasons of the year and what effects each of them produces, the winds, the qualities of the waters, the situation and exposure of the city, the character of the ground, and the mode of life of the inhabitants." Then, says the wise old Greek, "From these things he must proceed to investigate everything else."

There is a breadth of view in that last sentence which is particularly satisfactory. Since the days of Hippocrates there has accumulated a vast amount of literature relating to the supposed connection between the topographical peculiarities of different cities and countries, and the diseases which prevail in them, but when the books and essays which come under the heading of "Medical Topography" are examined, it will be found that the topographical part is much more complete than the medical—which last is mainly confined to the consideration of malarial diseases, and is vague and indefinite with regard to their relative prevalence.

Much the larger part of our really valuable information on this subject has been obtained within the last twenty-five years, as Prof. Hirsch points out in the preface to the recent edition of his very valuable handbook of geographical and historical pathology, and while the contributions of the United States to this branch of medical science have been already important, I hope to be able to show you that they are probably destined to be of steadily increasing importance in the future. Considered, as a body, the opportunities of the medical profession of the United States for the study of the manifold influences which can cause, modify, or prevent disease, are in some respects unequalled. As regards peculiarities of climate, soil, altitude, etc., the country is so large as to afford almost every variety of combination, so that nature may be said to be making a series of experiments, on a grand scale, upon the mass of

humanity which is so rapidly increasing in the new world. Especially is this the case with regard to the problems of heredity as connected with the mysterious relations of certain forms of disease to race. America is at present the great mixing bowl into which are pouring streams of human life from origins the most diverse, from regions the most remote. Black and white, red and yellow, long skulls and short skulls, Celt, Teuton, and Slav are being brought together under similar conditions of climate, food, and occupation, thus permitting of the comparison and study of the different effects, if such exist, which result from variations in parentage under conditions of exposure to the same causes of disease.

For a little time, a generation or two at least, the different streams remain pure, then there is more or less mingling, in some cases very little, in others very intimate, but always there is an opportunity of studying the races separately, as well as of investigating the results of their various mixtures.

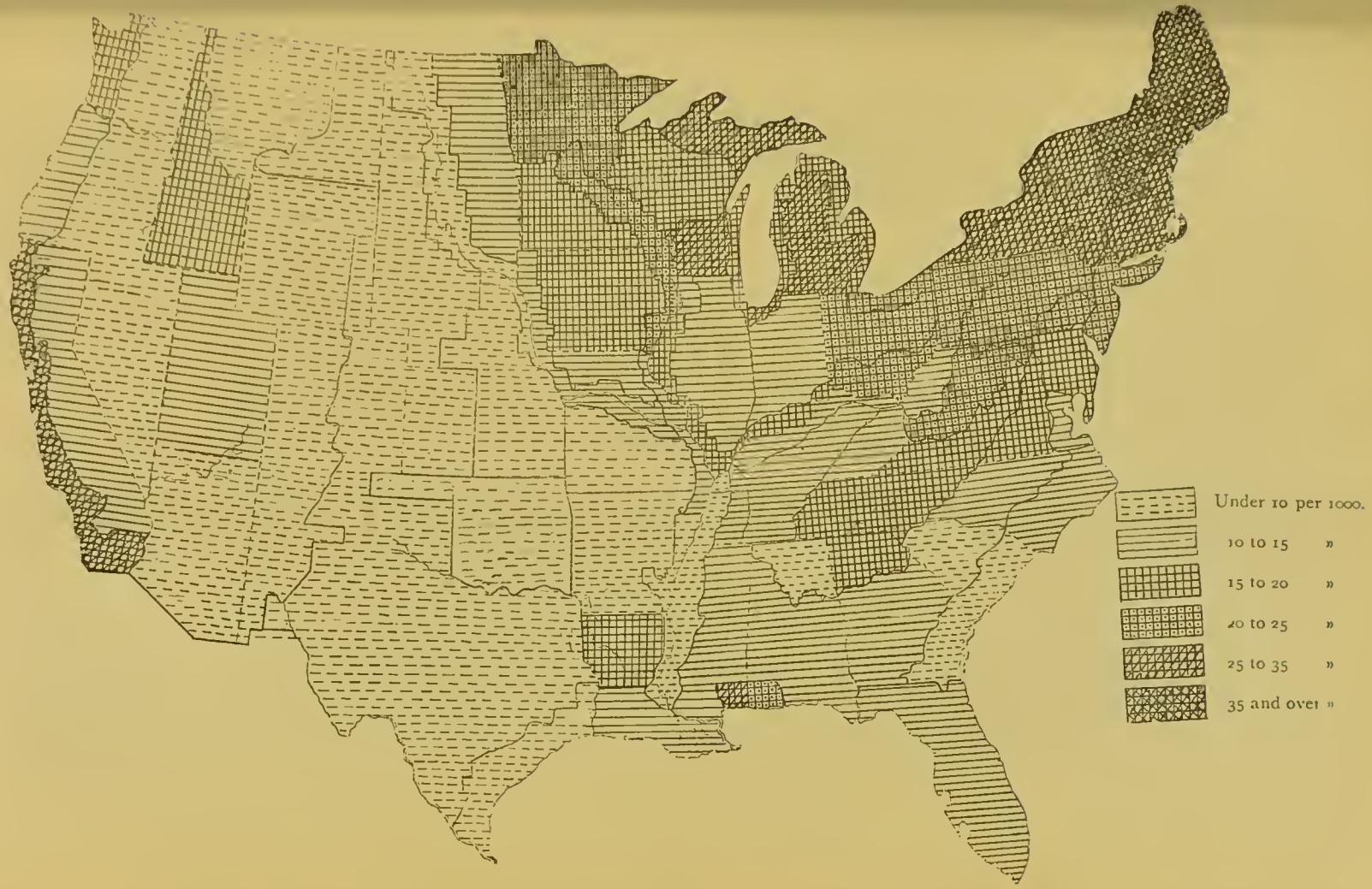
To illustrate the possibilities in this direction, I will call your attention to some peculiarities in the distribution of deaths from certain causes in different parts of the United States, and for this purpose I shall make use of the data from our last census, taken in 1880. We have no general and uniform system of registration of births and deaths. The larger cities, and about half a dozen States, have such a system, but for much the larger portion of the country the only means which we have for determining differences in amount or causes of mortality in different localities is through the census, which is taken once in ten years. The data thus obtained with regard to deaths are imperfect, because when these are collected, only at the end of the year, about thirty per cent. of the deaths are unrecorded; and they are inaccurate, because the reports of the causes of death are not furnished by persons competent to give reliable information with regard to them. Nevertheless, these data are the best that we have, and although for a large part of the country they do not give us the actual number of deaths from any cause or set of causes, they do furnish some interesting information with regard to the relative prevalence and importance of certain causes, and suggest questions and lines for future investigation, although they do not furnish definite and scientific answers.

Take, for instance, this map of the United States upon which, by varying shades of color, is shown the propor-

tion of deaths reported as due to cancer, as compared with the reported deaths from all causes. Cancer, using the term in its broadest sense, is a disease which seems to be gradually increasing in frequency among civilized nations, and, possibly, to have a tendency to increase with the advance of civilization.

In England and Wales the proportion of deaths from this cause seems to have nearly doubled within the last twenty-six years, and a similar rate of increase can be made out in certain parts of America. How far this increase is a real one, and how far it is due simply to improvement in diagnosis, is a question yet unanswered.

The mortality from cancer in the United States is proportionately greatest in the New England States, somewhat less so in New York and Pennsylvania, and it causes the least proportion of deaths in the Mississippi Valley and the South generally. The proportion of deaths from cancer in the United States is somewhat greater than it is in England; but it is not possible to make any accurate comparisons in this respect. Now why are the shades on this map so dark in the northeast and so light in the south? In the first place, cancer is a disease the mortality from which steadily increases with advanced age, as you may see from this diagram. Hence, cancer causes a higher proportion of mortality in those localities which have the greatest proportion of population living at advanced ages, and in the United States these localities are the New England States, as you will see by this map. One deduction from this which may perhaps not have occurred to all of you, is that a large proportion of deaths from cancer indicates, to a certain extent, that the locality in which it occurs is a healthy and long settled one, since it has probably a relatively large proportion of inhabitants, and especially females, of an advanced age. But another explanation of the peculiar shading of the cancer map is found in the relations of race to the tendency to death from this disease. The proportion of annual deaths from cancer per hundred thousand living population was, in round numbers, twenty-eight for the whites, and thirteen for the colored. That is to say, cancer is more than twice as prevalent among whites as it is among colored in the same localities, for these figures apply only to the South. On the other hand, cancer appears to cause a greater proportion of deaths in persons of Irish and German parentage, than it does among the rest of the white population, the indications being



Map of the United States showing the distribution of deaths from cancer as compared with total deaths from known causes.
Census of 1880.

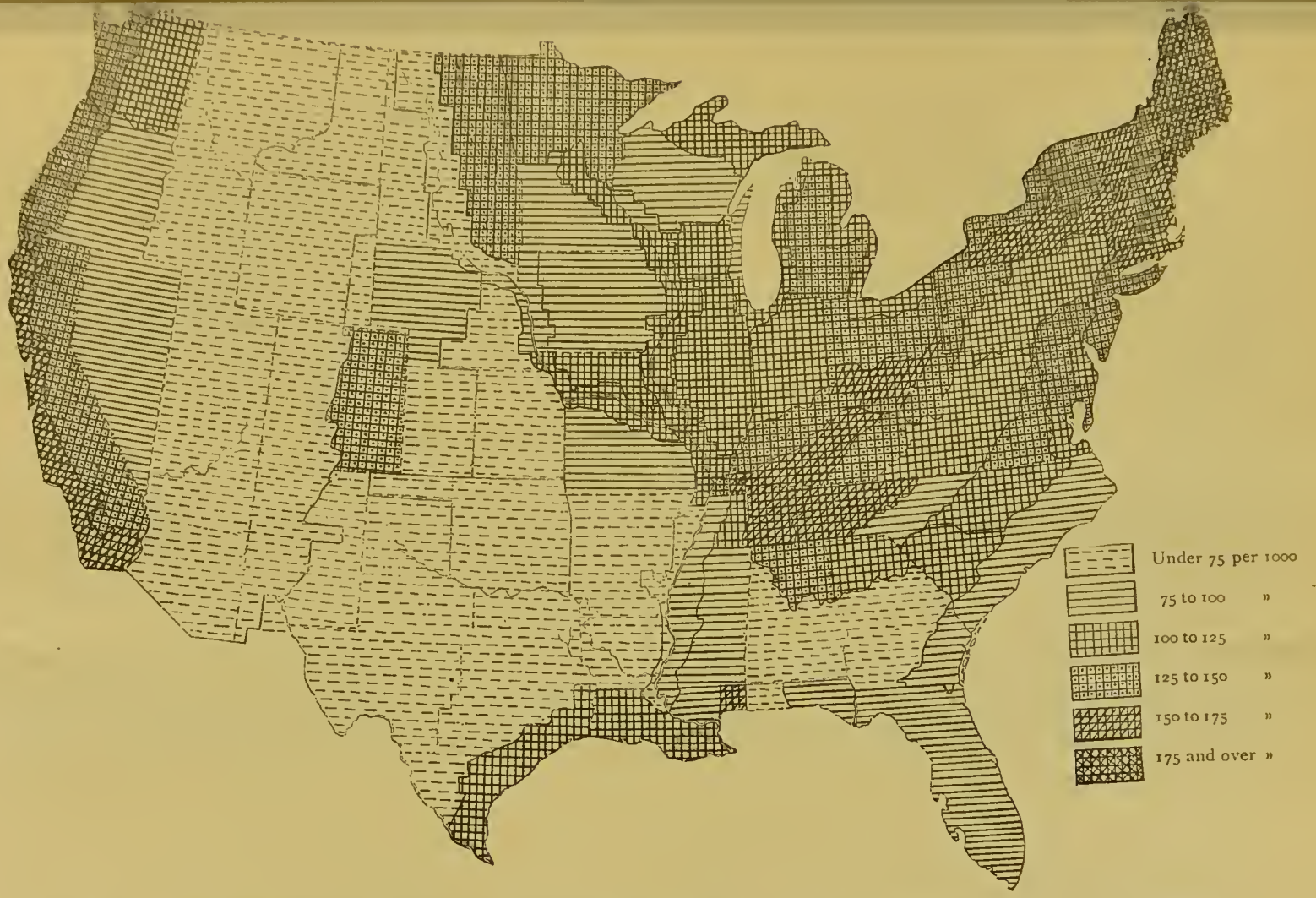
that between the ages of fifteen and sixty-five the Germans are especially liable to cancer; more so than the Irish, and decidedly more so than the average white population. Now when we remember that the greater part of the colored population is in the South, and the greater part of the Irish and German population is in the North, we have another reason for the differences in mortality caused by this disease in the two sections.

Again, take this map, showing the distribution of the deaths from scarlet fever during the census year. You see that this also was most fatal in the North, and, here again, the influence of race comes in, because in the negro race the mortality from this disease appears to be very low. This disease has always been much rarer in the South than in the North, and the contrast was much stronger in former years than it is at present; but this cannot be explained solely, or even to any great extent, by difference of temperature, because scarlet fever has often been epidemic in the tropics, and, on the other hand, in many localities in temperate climates it is among the rarest of diseases.

Here is another map showing the distribution of deaths reported as due to diphtheria during the year. Diphtheria is a disease which has been unusually prevalent in the northern portion of the United States for several years. During the census year it caused 2374 deaths out of every 100,000 deaths from all causes, while in England, for the year 1880, the deaths from diphtheria were 532 per 100,000 deaths from all causes; that is to say, the comparative mortality from this disease in England was less than one-fourth that of the United States for the same period. Dipththeria, again, is essentially a disease of the north, but especially of the northwest. It causes an excessive mortality in children of German parentage, sufficiently so to show that here again the influence of race comes into the problem, although, probably, only indirectly; that is to say, it is probable that it is the habits of a peculiar class of people which favor the propagation of the disease rather than any physical peculiarities in the structure of their bodies.

Two more illustrations of the geographical distribution of disease in the United States may be of interest in this connection. The first is that of consumption, the second, of pneumonia.

Consumption is a vague term, and, as used in the census, no doubt includes many cases which were not



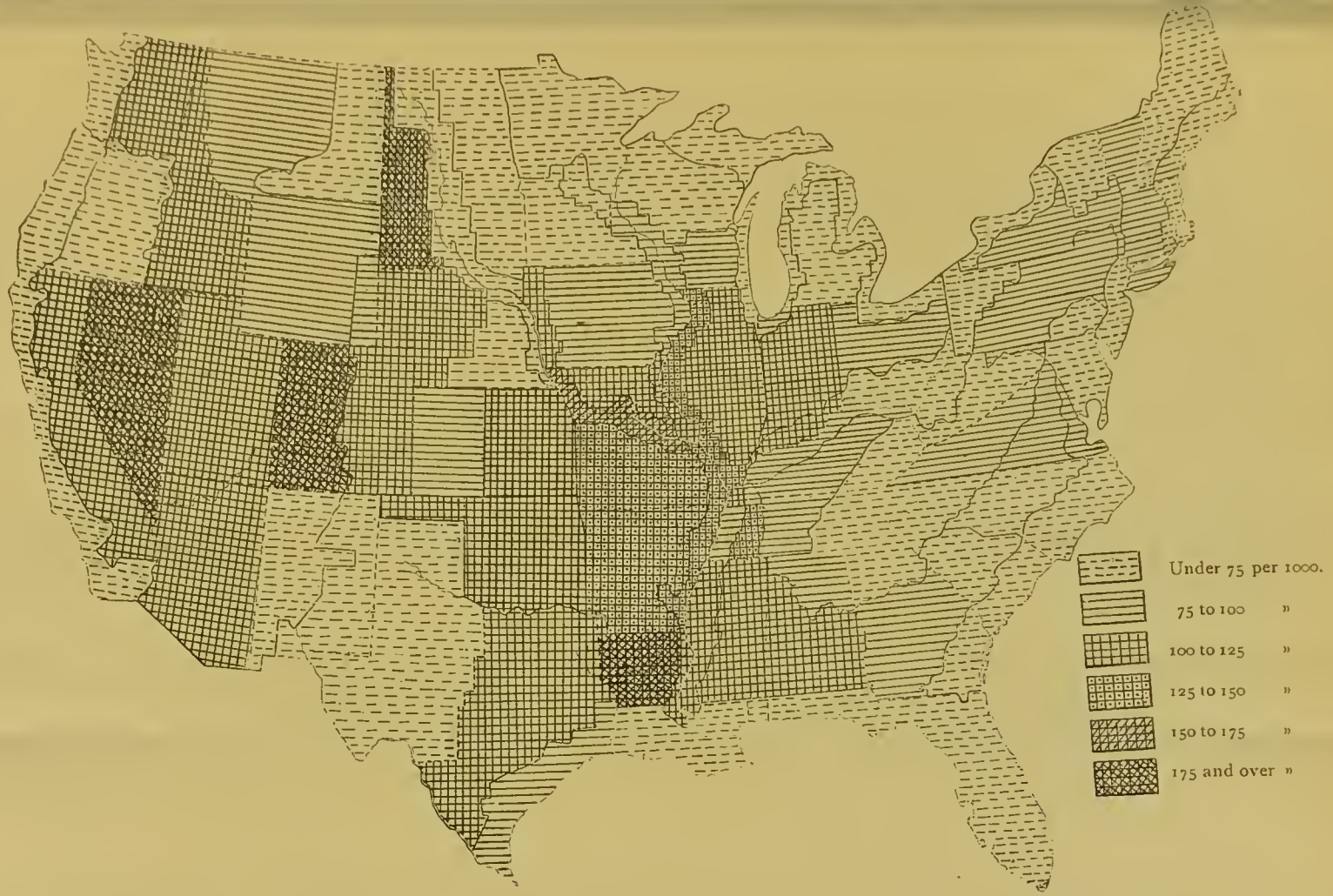
Map of the United States showing the distribution of deaths from consumption as compared with total deaths from known causes.
Census of 1880.

true tubercular phthisis. It is reported as causing twelve per cent. of all the deaths, or more than any other single cause. In England and Wales, in 1880, it caused a little over nine per cent. of all the deaths. Such wholesale ratios are, however, of little interest or value. There are very great differences in the liability to this disease in different parts of the United States, as the map makes sufficiently evident, and it is from a study of the causes of these differences in the data derived from large masses of people, combined with clinical histories and experimental laboratory work, that we have good reason to hope to obtain knowledge, not only of the causes of this disease, but of better methods of prevention and treatment than are now at our command. It causes a greater mortality among the Irish than in other white races, and, perhaps, a greater mortality among the colored than among the white.

Next to consumption, pneumonia is reported as causing the greatest number of deaths in the United States during the census year, giving a ratio of 8.3 per cent. of all deaths, as against 4.8 per cent. in England and Wales in 1880. Here, again, the local distribution of deaths is interesting, and the contrast between the map of consumption and that of pneumonia is very striking. Here, again, we find that race peculiarity is an important factor in the problem, the proportion of deaths from pneumonia among the colored being much greater than it is among the white.

I have elsewhere commented more fully than it is possible to do here upon these peculiarities of the distribution of certain causes of deaths in the United States.[1] In fact, my only object in calling your attention to the subject is to indicate the direction in which we may hope for good work hereafter, which indication is the chief, if not the only valuable result of the work already done. In the brief comments which I have made upon these maps you will have noticed the stress which I have laid upon race peculiarities. These race problems are simply problems of heredity taken in mass, and there is no need to urge upon an assemblage of medical practitioners the importance of considering family peculiarities in diagnosis, prognosis, and therapeutics. That the questions involved are difficult and complicated is true,

[1] See report on Mortality and Vital Statistics of the United States as returned at the tenth census, 2 vols. 4to., Washington, 1885–1886.



Map of the United States showing the distribution of deaths from pneumonia as compared with total deaths from known causes.
Census of 1880.

but we are already possessed of more knowledge with regard to them than is commonly supposed.

In a lecture on "Life," delivered a few months ago, Prof. Brookes, of the Johns Hopkins University, illustrated this as follows: "If I am placed, with my eyes bandaged, before a stone lying free on the surface and am told to kick it, and if I know at the same time the size, shape, and weight of the stone and the character of the surface, I can form a pretty accurate idea as to what the result upon the stone will be. While if the object to be kicked is a dog, and I am given precisely the same data, I cannot tell what will be the effect. But if I can see the dog, I can, in many cases, predict pretty accurately. If he is a bulldog, he will do one thing; if he is a Gordon setter, he will do another." And, in like manner, the old family doctor knows that when a particular disease appears in his neighborhood, he may expect to see it produce in one family convulsions, in another collapse, and, in a third, little or no danger or inconvenience.

This kind of knowledge is, however, at present mainly confined to individuals, it has not become a part of the world's knowledge; it is not defined; in other words, it is not scientific. To make it so, is the work of the future, and in this work I hope that we shall be able to help you.

I have spoken to little purpose if I have failed to show you that there is a great deal of human nature in American physicians, and that it is a kind of human nature with which you are tolerably familiar. It should be so, for we are of the same race, a race which, perhaps, as Emerson says, "sets a higher value on wealth, victory, and material superiority than other men, has less tranquillity, is less easily contented." Our ancestors were restless, fighters, freebooters, and from these ancestors we have the common inheritance of energy; of what *we* call "firmness," and our opponents unreasonable, pig-headed, stubbornness; of liking to manage our own affairs, and, at the same time, to exercise a little judicious supervision over those of our neighbors; of hatred of humbug, and lying; and, in spite of our discontent, of a firm belief that our wives and children, habits, houses, modes of business, and of treating disease are, on the whole, better than those of any other people under the sun.

Privately, and between ourselves, we grumble and declare that the country and profession are going to the

dogs—nay, we must do so, or we should not be of true English blood, but there is no need for me to tell you that these are only "growing pains," and not symptoms of progressive ataxy.

While we must consider the difficulties in the way of the improvement of the science and art of medicine, difficulties due to ignorance, to indolence, to conflict of interests, and to the eternal fitness of things, the existence of such difficulties is not a matter to be bemoaned and lamented over. These obstacles are the spice of life, the incentives to action, the source of some of the greatest pleasures which it is given to man to experience.

The child, spending a happy hour with its new puzzle, is a type of the scientific investigator. The naturalist who objected to the statement that this is a miserable world which it is well to be soon done with, on the ground that there are still many species of rhizopods which he had not examined and classified, is another type. On the ethical and sociological side, the matter is summed up in Ruskin's aphorism, that "Fools were made that wise men may take care of them."

It is surely not without cause that there has been given to us this restless spirit of inquisitiveness, this desire to compass the heavens and the earth, this raging, infinite thirst for knowledge, it is the outcome of brain training and natural selection for thousands and tens of thousands of years.

We are in a period of the world's history characterized by material prosperity, by increase of populations, by tendencies to uniformity, to the making of individuals of small account. According to the Swiss philosopher, Alphonse de Candolle, this is to last a thousand years or so, after which the pendulum will swing the other way, and there will follow a long period of diminution and separation of peoples, and of decadence.

Against that decay of nations we know of but one remedy, and that is increase of knowledge and of wisdom. And this increase must be in *our* knowledge, in the world's wisdom, and not merely in that of John, or Fritz, or Claude

As each man has special opportunities and duties, if he can only recognize them, so it is with guilds, with professions, and with nations.

I have tried to indicate to you some of these opportunities which are presenting themselves to my colleagues, your brothers, in the lands beyond the sea, and I hope that I shall not be considered rash, or vainglorious in

saying that I believe they will so use those opportunities as to return compound interest for what they have received from the storehouse of our common inheritance. Force changes form and place, the stored energy of the soil of our plains and valleys has been coming here in the form of meat and grain, has appeared in muscle and brain, and in a hundred other shapes, but none has been destroyed; our loss has been your gain, and in our turn we have received full and fair exchange.

It is our part now to remember that there are not two springs in the year, there are not two periods of youth abounding in energy and desire, or of manhood's strength and self-poise, in the life of any man or of any nation, and for us, as for those who have been before us, the Kanuri proverb holds true, "*Kabu datsia, kargum bago*"—The days being finished, there is no more medicine.